

**WHAT IS CLAIMED IS:**

1           1. A data structure for implementing a traffic engineering function in a multiprotocol label  
2 switching system, comprising:

3           a subscriber profile including a plurality of entries for storing forwarding equivalence class  
4 (FEC) information required for setup of a label switched path (LSP) based on the traffic engineering  
5 function, said entries of said subscriber profile being sequentially assigned indexes corresponding  
6 to a given traffic engineering service subscriber identification (ID);

7           a path profile including a plurality of entries for storing respective items of path information  
8 regarding a type length value (TLV) of a signal protocol required for setup of an explicit routed label  
9 switched path (ER-LSP) based on the traffic engineering function, said entries of said path profile  
10 being sequentially assigned indexes corresponding to the respective items of the path information;  
11 and

12           a quality of service (QoS) profile including a plurality of entries for storing respective items  
13 of QoS information regarding a TLV of a signal protocol required for setup of a constraint routed  
14 label switched path (CR-LSP) based on the traffic engineering function, said entries of said QoS  
15 profile being sequentially assigned indexes corresponding to the respective items of QoS  
16 information.

1           2. The data structure as set forth in claim 1, wherein said indexes assigned to said profile  
2           entries include a plurality of indexes set by an operator for interlinking corresponding ones of said  
3           entries of said subscriber profile, said entries of said path profile, and said entries of said QoS  
4           profile.

1           3. The data structure as set forth in claim 1, wherein each of said entries of said subscriber  
2           profile includes:

3           a field for storing information about a type of a network service desired by a subscriber;

4           an FEC table field having a plurality of entries, said entries of said FEC table field containing  
5           a plurality of FEC information items corresponding to network service type and being sequentially  
6           assigned indexes corresponding respectively to the plurality of FEC information items;

7           a field for use, when an Internet protocol packet to be sent by a longest prefix matching  
8           method cannot be forwarded for an emulated leased line service, in storing an identifier of a source  
9           address of the Internet protocol packet;

10          a field for use, when the Internet protocol packet to be sent by the longest prefix matching  
11          method cannot be forwarded for the emulated leased line service, in storing an identifier of a  
12          destination address of said Internet protocol packet; and

13          a path index table field for storing indexes of certain ones of said entries of said path profile  
14          linked to a corresponding one of said entries of said subscriber profile.

4. The data structure as set forth in claim 3, wherein each of said entries of said subscriber profile is linked to plural ones of said entries of said path profile, each of the linked entries of said path profile having an index assigned a priority and stored in said path index table field for setup of a bypass path.

5. The data structure as set forth in claim 3, wherein each of said entries of said FEC table field includes:

a field for storing a source port number available in a higher-order application program for a real-time service;

a field for storing a destination port number available in the higher-order application program for the real-time service;

an address table field having a plurality of entries, said entries of said address table field storing a plurality of address information items and being sequentially assigned indexes corresponding to respective ones of the address information items; and

a field for storing information about a number of said entries of said address table field.

6. The data structure as set forth in claim 5, wherein each of said entries of said address table field includes:

3 a field for storing said source address of said Internet protocol packet to be sent;

4 a field for storing information about a prefix length of said source address;

5 a destination address table field having a plurality of entries, said entries of said destination  
6 address table field containing a plurality of respective destination address information items of said  
7 Internet protocol packet to be sent, and being sequentially assigned indexes corresponding to the  
8 respective destination address information items; and

9 a field for storing information about a number of said entries in said destination address table  
10 field.

11 7. The data structure as set forth in claim 6, wherein each of said entries of said destination  
12 address table field includes:

13 a field for storing said destination address of said Internet protocol packet to be sent; and

14 a field for storing information about a prefix length of said destination address.

1 8. The data structure as set forth in claim 1, wherein each of said entries of said path profile  
2 includes:

3 a field for storing an identifier of a label switched path set-up according to the traffic  
4 engineering function;

5 an explicit routed-hop table field having a plurality of entries, said entries of said explicit

6 routed-hop table field storing a plurality of explicit routed-hop type length value (ER-Hop TLV)  
7 determination information items and being sequentially assigned indexes corresponding to respective  
8 ones of the ER-Hop TLV determination information items;

9 a field for storing information determining a preemption TLV of a signal protocol;

10 a field for storing information about a bypass path priority of a corresponding one of said  
11 entries of said path profile linked to a certain one of said entries of said subscriber profile; and

12 a field for storing an index of a given one of said entries of said QoS profile linked to a  
13 corresponding entry of the path profile.

1 9. The data structure as set forth in claim 1, wherein each of said entries of said QoS profile  
2 entries includes:

3 a field for storing information about a QoS category;

4 a field for storing information determining a frequency of a traffic TLV of a signal protocol;

5 a field for storing information determining a peak data rate of said traffic TLV;

6 a field for storing information determining a peak bucket size of said traffic TLV;

7 a field for storing information determining a committed data rate of said traffic TLV; and

8 a field for storing information determining a committed bucket size of said traffic TLV.

10. A computer-readable storage medium for storing a data structure for implementation of a traffic engineering function in a multiprotocol label switching system, said data structure comprising:

a subscriber profile including a plurality of entries for storing forwarding equivalence class (FEC) information required for setup of a label switched path (LSP) based on the traffic engineering function, said entries of said subscriber profile being sequentially assigned indexes corresponding to a given traffic engineering service subscriber identification (ID);

a path profile including a plurality of entries for storing respective items of path information regarding a type length value (TLV) of a signal protocol required for setup of an explicit routed label switched path (ER-LSP) based on the traffic engineering function, said entries of said path profile being sequentially assigned indexes corresponding to the respective items of the path information; and

a quality of service (QoS) profile including a plurality of entries for storing respective items of QoS information regarding a TLV of a signal protocol required for setup of a constraint routed label switched path (CR-LSP) based on the traffic engineering function, said entries of said QoS profile being sequentially assigned indexes corresponding to the respective items of QoS information.

11. The computer-readable storage medium of claim 10, wherein said indexes assigned to said profile entries include a plurality of indexes set by an operator for interlinking corresponding

ones of said entries of said subscriber profile, said entries of said path profile, and said entries of said QoS profile.

12. The computer-readable storage medium of claim 10, wherein each of said entries of said subscriber profile includes:

a field for storing information about a type of a network service desired by a subscriber;

an FEC table field having a plurality of entries, said entries of said FEC table field containing a plurality of FEC information items corresponding to network service type and being sequentially assigned indexes corresponding respectively to the plurality of FEC information items;

a field for use, when an Internet protocol packet to be sent by a longest prefix matching method cannot be forwarded for an emulated leased line service, in storing an identifier of a source address of the Internet protocol packet;

a field for use, when the Internet protocol packet to be sent by the longest prefix matching method cannot be forwarded for the emulated leased line service, in storing an identifier of a destination address of said Internet protocol packet; and

a path index table field for storing indexes of certain ones of said entries of said path profile linked to a corresponding one of said entries of said subscriber profile.

13. The computer-readable storage medium of claim 12, wherein each of said entries of said

subscriber profile is linked to plural ones of said entries of said path profile, each of the linked entries of said path profile having an index assigned a priority and stored in said path index table field for setup of a bypass path.

14. The computer-readable storage medium of claim 12, wherein each of said entries of said FEC table field includes:

a field for storing a source port number available in a higher-order application program for a real-time service;

a field for storing a destination port number available in the higher-order application program for the real-time service;

an address table field having a plurality of entries, said entries of said address table field storing a plurality of address information items and being sequentially assigned indexes corresponding to respective ones of the address information items; and

a field for storing information about a number of said entries of said address table field.

15. The computer-readable storage medium of claim 14, wherein each of said entries of said address table field includes:

a field for storing said source address of said Internet protocol packet to be sent;

a field for storing information about a prefix length of said source address;



5 a destination address table field having a plurality of entries, said entries of said destination  
6 address table field containing a plurality of respective destination address information items of said  
7 Internet protocol packet to be sent, and being sequentially assigned indexes corresponding to the  
8 respective destination address information items; and

9 a field for storing information about a number of said entries in said destination address table  
10 field.

1 16. The computer-readable storage medium of claim 15, wherein each of said entries of said  
2 destination address table field includes:

3 a field for storing said destination address of said Internet protocol packet to be sent; and  
4 a field for storing information about a prefix length of said destination address.

1 17. The computer-readable storage medium of claim 10, wherein each of said entries of said  
2 path profile includes:

3 a field for storing an identifier of a label switched path set-up according to the traffic  
4 engineering function;

5 an explicit routed-hop table field having a plurality of entries, said entries of said explicit  
6 routed-hop table field storing a plurality of explicit routed-hop type length value (ER-Hop TLV)  
7 determination information items and being sequentially assigned indexes corresponding to respective

ones of the ER-Hop TLV determination information items;

a field for storing information determining a preemption TLV of a signal protocol;

a field for storing information about a bypass path priority of a corresponding one of said entries of said path profile linked to a certain one of said entries of said subscriber profile; and

a field for storing an index of a given one of said entries of said QoS profile linked to a corresponding entry of the path profile.

18. The computer-readable storage medium of claim 10, wherein each of said entries of said QoS profile entries includes:

a field for storing information about a QoS category;

a field for storing information determining a frequency of a traffic TLV of a signal protocol;

a field for storing information determining a peak data rate of said traffic TLV;

a field for storing information determining a peak bucket size of said traffic TLV;

a field for storing information determining a committed data rate of said traffic TLV; and

a field for storing information determining a committed bucket size of said traffic TLV.

19. A label switched path (LSP) setup method, comprising the steps of:

(a) receiving an LSP setup request and profile entry indexes;

3 (b) interlinking created profile entries in accordance with the received profile and indexes;

4 (c) checking a quality of service (QoS) index field to determine whether a linked QoS profile  
5 entry is present; and

6 (d) setting up the LSP based on the determination of step (c).

1 20. The method of claim 19, further comprising the step, between steps (b) and (c), of  
2 commencing setup of the LSP through signal protocol with reference to information as to linked  
3 profile entries.

4 21. The method of claim 19, wherein step (d) comprises the step of setting up a constraint  
5 routed label switched path (CR-LSP) when the linked QoS profile entry is present.

6 22. The method of claim 19, wherein step (d) comprises the step of setting up an explicit  
1 routed label switched path (ER-LSP) when the linked QoS profile entry is not present.

2 23. The method of claim 19, further comprising step (e) of registering an LSP identifier,  
1 assigned through a signal protocol, in a corresponding path profile entry.

1           24. The method of claim 23, further comprising step (f) of storing the LSP identifier and  
2 forwarding equivalence class (FEC) information in a forwarding table.

1           25. A label switched path (LSP) release method, comprising the steps of:

2           (a) receiving a LSP release request and a corresponding LSP identifier;

3           (b) searching for a path profile entry corresponding to the received LSP identifier;

4           (c) extracting LSP release data from a profile entry linked to the searched path profile entry;

5           (d) checking a quality of service (QoS) index field in order to determine whether a linked  
6 QoS profile entry is present; and

7           (e) releasing the LSP based on the determination of step (d).

8           26. The method of claim 25, wherein a constraint routed label switched path (CR-LSP) is  
9 released when the linked QoS profile entry is present.

1           27. The method of claim 25, wherein a explicit routed label switched path (ER-LSP) is  
2 released when the linked QoS profile entry is not present.

1           28. The method of claim 25, further comprising step (f) of removing forwarding equivalence

class (FEC) information of the released LSP from a forwarding table.

29. The method of claim 28, further comprising step (g) of initializing the identifier of the released LSP in a corresponding path profile entry.

30. The method of claim 25, further comprising step (f) of initializing the identifier of the released LSP in a corresponding path profile entry.